

This listing of claims will replace all prior versions of claims in the application.

Claim 1. (currently amended) A method for providing an ion-implanted semiconductor substrate comprising:
providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,
wherein the photoresist comprises a resin that comprises, prior to photoactivation, photoacid-labile moieties that are spaced by at least 2 atoms ~~†atom~~ from the resin backbone; and
applying ~~dopant~~ ions to the substrate.

Claim 2. (currently amended) A method for providing an ion-implanted semiconductor substrate comprising:
providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,
wherein the photoresist comprises, prior to photoactivation, a resin that comprises units that contain photoacid-labile moieties in an amount of 12 mole percent or less, based on total units of the resin; and
applying ~~dopant~~ ions to the substrate.

Claim 3. (currently amended) A method for providing an ion-implanted semiconductor substrate comprising:
providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,
wherein the photoresist comprises, prior to photoactivation, a resin that comprises units that contain photoacid-labile moieties that have multiple covalent linkages to the resin prior to a photoacid-deblocking reaction; and
applying ~~dopant~~ ions to the substrate.

Claim 4. (currently amended) A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

wherein the photoresist comprises, prior to photoactivation, one or more components that are covalently linked by a group that can be cleaved by exposure and/or photogenerated acid; and applying dopant ions to the substrate.

Claim 5. (currently amended) A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

wherein the photoresist comprises, prior to photoactivation, photoacid-labile groups that generate upon photoactivation a cleavage product that comprises 5 or more carbon atoms and/or a single or multiple ring structure; and

applying dopant ions to the substrate.

Claim 6. (currently amended) A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,

treating the photoresist composition image thermally or with radiation to remove volatile materials of the photoresist composition; and

applying dopant ions to the substrate.

Claim 7. (currently amended) A method for providing an ion-implanted semiconductor substrate comprising:

providing a semiconductor substrate having coated thereon a relief image of chemically-amplified positive-acting photoresist composition,
treating the photoresist composition image to provide a coating thereon; and
applying dopant ions to the substrate.

Claim 8. (currently amended) A coated substrate comprising:
a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises a resin that comprises, prior to photoactivation, photoacid-labile moieties that are spaced by at least ~~2 atoms~~ ^{1 atom} from the resin backbone; and
the wafer having applied dopant ions.

Claim 9. (currently amended) A coated substrate comprising:
a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises, prior to photoactivation, a resin that comprises units that contain photoacid-labile moieties in an amount of 12 mole percent or less, based on total units of the resin; and
the wafer having applied dopant ions.

Claim 10. (original) A coated substrate comprising:
a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises, prior to photoactivation, a resin that comprises units that contain photoacid-labile moieties that have multiple covalent linkages to the resin prior to a photoacid-deblocking reaction; and
the wafer having applied dopant ions.

Claim 11. (original) A coated substrate comprising:
a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises, prior to photoactivation, one or more components that are covalently linked by a group that can be cleaved by exposure and/or photogenerated acid; and
the wafer having applied dopant ions.

Claim 12. (original) A coated substrate comprising:
a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that comprises, prior to photoactivation, photoacid-labile groups that generate upon photoactivation a cleavage product that comprises 5 or more carbon atoms and/or a single or multiple ring structure; and
the wafer having applied dopant ions.

Claim 13. (original) A coated substrate comprising:
a semiconductor wafer having coated thereon a relief image of chemically-amplified positive-acting photoresist composition that is coated; and
the wafer having applied dopant ions.

Claim 14. (cancelled)

Claim 15. (previously presented) A chemically-amplified positive-acting photoresist composition that comprises:

- i) one or more photoacid generator compounds and
- ii) a resin or component chosen from among
a resin that comprises units that contain photoacid-labile moieties in an amount of 8 mole percent or less, based on total units of the resin;
a resin that comprises units that contain photoacid-labile moieties that have multiple

covalent linkages to the resin prior to a photoacid-deblocking reaction;

one or more components that are covalently linked by a group that can be cleaved by exposure and/or photogenerated acid;

a resin that comprises units that contain photoacid-labile moieties in an amount of 8 mole percent or less, based on total units of the resin; and

a resin that comprises units that contain photoacid-labile moieties that have multiple covalent linkages to the resin prior to a photoacid-deblocking reaction.

Claims 16-19. (cancelled)

Claim 20. (previously presented) The method of claim 1 wherein the photoresist composition has been applied to the wafer, exposed to patterned radiation having a wavelength of 248 nm, and developed to provide the relief image.

Claim 21. (previously presented) The method of claim 2 wherein the photoresist composition has been applied to the wafer, exposed to patterned radiation having a wavelength of 248 nm, and developed to provide the relief image.

Claim 22. (previously presented) The method of claim 3 wherein the photoresist composition has been applied to the wafer, exposed to patterned radiation having a wavelength of 248 nm, and developed to provide the relief image.

Claim 23-26. (cancelled)

Claim 27. (new) The method of claim 20 wherein the photoresist comprises a resin that comprises, prior to photoactivation, photoacid-labile moieties that are spaced by at least 3 atoms from the resin backbone.

Claim 28. (new) The method of claim 20 wherein the photoresist comprises a resin that comprises, prior to photoactivation, photoacid-labile moieties that are spaced by at least 4 atoms from the resin backbone.

Claim 29. (new) The method of claim 20 wherein the photoresist comprises a resin that comprises, prior to photoactivation, photoacid-labile moieties that are spaced by at least 6 atoms from the resin backbone.

Claim 30. (new) The method of claim 20 wherein the dopant ions are boron, arsenic or phosphorus ions.